

# PATENT ABSTRACTS OF JAPAN

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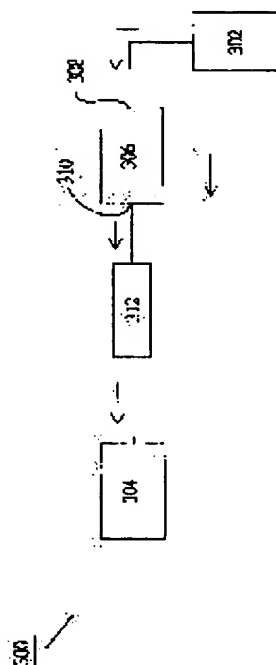
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## (54) CLEAN SYSTEM

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a clean system which can shorten the closedown time, can increase a throughput and has a long working life.

**SOLUTION:** The clean system 300 includes a reservoir 302 for storing a cleaning fluid, a clean head 304 for cleaning pads (or leads) 404 on a substrate, and a metering pump 306 other than a peristaltic pump for pumping the cleaning fluid from the reservoir 302 to the clean head 304. Suitable metering pumps for use in the present invention are piston pumps, gear pumps or diaphragm pumps.



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CLAIMS

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[Claim(s)]

[Claim 1] the [ for being the system which defecates said substrate which has at least one pad formed on the 1st front face on a substrate, and defecating the depot which stores the fluid for defecation, and said pad on said substrate ] -- the system possessing 1 clean head and measuring pumps other than the peristaltic pump for carrying out the regurgitation of said fluid for defecation from said depot to said clean head.

[Claim 2] the [ the input where it connects with said depot and said measuring pump enables the inflow to said measuring pump of said fluid for defecation which should be breathed out, and / said ] -- the system of the claim 1 publication characterized by providing the tap hole which is connected to 1 clean head and enables the inflow on said clean head from said measuring pump of said fluid for defecation which should be breathed out.

[Claim 3] said system -- further -- the [ said / a measuring pump and / said ] -- the 1st check valve arranged between 1 clean heads -- providing -- this check valve -- said fluid for defecation -- the [ said ] -- the system of the claim 1 publication characterized by closing the valve alternatively in order to prevent flowing backwards from 1 clean head to said measuring pump.

[Claim 4] The system of the claim 1 publication characterized by having the string-like object which said clean head supports said fluid for defecation, contacts said pad on said substrate, and defecates.

[Claim 5] Said string-like object is the system of the claim 4 publication characterized by being a nonwoven string-like object.

[Claim 6] Said measuring pump is the system of the claim 1 publication characterized by being a piston pump.

[Claim 7] Said measuring pump is the system of the claim 1 publication characterized by being a gear pump.

[Claim 8] Said measuring pump is the system of the claim 1 publication characterized by being a diaphragm pump.

[Claim 9] Said measuring pump is the system of the claim 1 publication characterized by being the diaphragm pump of a solenoid drive.

[Claim 10] the [ which said system is further connected to said measuring pump, and defecates said 1st front face and the 2nd front face of said substrate which counters ] -- the [ 2 clean head and / said / a measuring pump and / said ] -- it arranges between 2 clean heads -- having -- said fluid for defecation -- the [ said ] -- the system of the claim 1 publication characterized by providing the check valve alternatively closed in order to prevent flowing backwards from 2 clean head to said measuring pump.

[Claim 11] The system of the claim 10 publication characterized by having the string-like object which said each clean head supports said fluid for defecation, contacts said 1st front face or said 2nd front face of said substrate, and defecates.

[Claim 12] Said string-like object is the system of the claim 10 publication characterized by being a nonwoven string-like object.

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**DETAILED DESCRIPTION**


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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** Generally this invention relates to a clean system, especially the clean system which defecates the pad (or lead) formed on a display panel.

**[0002]**

**[Description of the Prior Art]** As a display panel of electronic equipment, the liquid crystal panel and the plasma display panel are known conventionally. Generally, such a display panel is assembled by combining the external lead of a driving gear with the pad (or lead) located in the edge of the lower panel which consists of a glass plate. a common driver (drive circuit) -- TAB (tape automation ITIDDO bonding) -- it consists of a tape career package (henceforth TCP) formed of law.

**[0003]** However, before a bonding process is performed, in order to secure the good electric contact between the external lead of TCP, and the pad (or lead) of a panel, it is necessary to defecate the pad (or lead) of a panel. Therefore, generally conventional external lead bonding equipment has a clean system for defecating the pad (or lead) of a panel. As shown in drawing 1 , the conventional clean system 100 has two processing units 102 in order to supply the fluid for defecation to the up clean head 106 and the lower clean head 108 from a depot 104, respectively.

**[0004]** Now, each processing unit 102 possesses a peristaltic pump 200 (refer to drawing 2 ), in order to ensure exact supply of the fluid for defecation of the amount of setup, respectively. As shown in drawing 2 R> 2, actuation of a peristaltic pump 200 is performed using the rotation roller head 204 by compressing or extracting the tube 202 (arranged between fixed passage) which can be crooked for predetermined die length. If the roller head 204 rotates, a roller 206 will pinch some tubes 202 and will extrude any fluids with which it is supplemented in the tube 202 between rollers 206 to a hand of cut. Under the present circumstances, a flow rate is determined by the rotational speed and driving force of the roller head 204.

**[Problem(s) to be Solved by the Invention]**

**[0005]** However, there are the following troubles in using a peristaltic pump as a processing unit in such external lead bonding equipment.

(a) The tube which can be crooked for a peristaltic pump wears out during actuation, consequently produces flow rate change which is not desirable as for a defecation fluid.

(b) On the occasion of the exchange, it is necessary to exchange the worn tube periodically and to suspend the whole external lead bonding equipment completely.

(c) Wear the device section of a peristaltic pump out easily.

These faults increase operation hold time amount remarkably, and they not only increase costs required for exchange of a tube or repair of a peristaltic pump, but bring about sharp reduction of throughput.

**[0006]** Therefore, this invention can solve the problem of the conventional technique mentioned above, or can reduce it at least, and it aims at offering the clean system of the long operation life which can increase throughput while being able to lessen operation hold time amount. Other purposes of this invention are to offer a clean system with the dependability which uses it in an external lead bonding process in order to defecate a substrate with the pad (or lead) formed on this substrate.

**[Means for Solving the Problem]**

**[0007]** the [ the depot with which the clean system concerning this invention mainly stores the fluid for defecation in order to attain the above-mentioned purpose and other above-mentioned purposes, and ] -- 1 clean head and the fluid for defecation -- the [ from a depot ] -- measuring pumps other than the peristaltic pump which carries out the regurgitation to 1 clean head are provided. The measuring pump which can be suitably used in this invention is the piston pump, gear pump, or diaphragm pump characterized by having

the dead air space of the fixed volume for carrying out the regurgitation of this volume for every regurgitation cycle. A measuring pump has input and a tap hole. It connects with the depot and input enables the inflow to the measuring pump of the fluid for defecation. a tap hole -- the -- it connects with 1 clean head -- having -- \*\*\*\* -- the [ from the measuring pump of the fluid for defecation ] -- an inflow on 1 clean head is enabled. a clean system -- the fluid for defecation -- the -- in order to prevent flowing backwards from 1 clean head to a measuring pump -- the [ a measuring pump and ] -- the check valve arranged between 1 clean heads can also be provided.

[0008] a clean system -- the -- 2 clean head can also be provided. the [ the 1st and ] -- 2 clean head is connected to the same above-mentioned measuring pump. A clean head possesses preferably the string-like object which contacts on the surface of half-finished products, and is defecated, for example, a nonwoven string-like object. a string-like object -- the fluid for defecation -- \*\*\*\*\* -- by things, a clean head can wipe off dust, dust, and other surface contamination matter easily from the front face of half-finished products.

[0009] The clean system concerning this invention permutes the conventional peristaltic pump with a piston pump, a gear pump, and a measuring pump like a diaphragm pump. In actuation of a piston pump, a gear pump, or a diaphragm pump, since components like the tube which can be crooked for the conventional peristaltic pump which wear out easily are not needed, while being able to make the operation life of a clean system longer than the conventional clean system, therefore being able to reduce operation hold time amount, throughput can be increased. Furthermore, the clean system concerning this invention can fully coexist neither with the existing ingredient used for an external lead bonding process, nor a related device, and does not affect those engine performance.

[0010] This invention offers the clean system which can have a long operation life by permuting the conventional peristaltic pump with a measuring pump like a piston pump, a gear pump, or a diaphragm pump. The solution shown here cannot fully coexist with existing equipment, and does not affect those engine performance.

[Embodiment of the Invention]

[0011] Drawing 3 is the block diagram showing the clean system 300 concerning one example of this invention. The clean system 300 mainly possesses a depot 302, the clean head 304, and a measuring pump 306. The depot 302 contains a fluid for defecation like isopropyl alcohol (IPA). A measuring pump 306 carries out the regurgitation of the fluid for defecation towards the clean head 304 from a depot 302. A measuring pump 306 has input 308 and a tap hole 310. Since it connects with the depot 302, the inflow to the measuring pump 306 of the fluid for defecation breathed out of input 308 is attained. Since it connects with the clean head 304, the inflow of a tap hole 310 into the clean head 304 of the fluid for defecation breathed out from a measuring pump 306 is attained. A clean system may possess the check valve 312 arranged between a measuring pump 306 and the clean head 304. A check valve 312 is alternatively closed, in order that the fluid for defecation may prevent flowing backwards from the clean head 304 to a measuring pump 306. The clean head 304 concerning this invention is suitably used, in order to defecate the pad (or lead) 404 (only one pad is shown by the reference number 404.) formed in the top face 402 of a display panel 406 (refer to drawing 5 ). In order to defecate the clean head 304 preferably, contacting the pad 404 on a display panel 406 (or lead), it has the string-like object 400 which consists of a nonwoven string-like object. if the fluid for defecation is breathed out in the clean head 304 -- a string-like object 400 -- the fluid for defecation -- \*\*\*\*\* -- since things are made, dust, dust, and other surface contamination matter can be easily wiped off from the front face of a pad (or lead) 404.

[0012] Drawing 4 is the block diagram showing the clean system 350 concerning other examples of this invention. As shown in drawing 4, in order to defecate the top face 402 of a display panel 406, and the inferior surface of tongue which counters further, by this invention, another clean head 314 connected with the same measuring pump 306 is provided (refer to drawing 5 ). The clean head 314 has the same structure and the same ingredient as substantially as the clean head 304. A measuring pump carries out the regurgitation of the fluid for defecation from a depot 302 to both the clean head 304 and the clean head 314. Preferably, the clean system 350 has the check valve 316 arranged between a measuring pump 306 and the clean head 314. A check valve 316 is alternatively closed, in order that the fluid for defecation may prevent flowing backwards from the clean head 314 to a measuring pump 306.

[0013] The measuring pump suitable for use by this invention is the piston pump characterized by having the dead air space of the fixed volume which carries out the regurgitation of this volume for every regurgitation cycle, a gear pump, or a diaphragm pump. A piston pump uses a reciprocation plunger in order to move a liquid through a unit. A piston pump consists of a rigid piston assembly, and a piston pump can have the highest pressure and precision as a measuring pump by such configuration. A gear pump operates

by transporting the fluid which intervenes between the gear teeth of two or three gears to rotate. Since much small dead air space is moved per rotation, a piston pump does not ripple a gear pump more frequently. A diaphragm pump moves a liquid for every stroke by making the diaphragm which can be crooked freely ripple. A pump action increases further with the reciprocation piston (not shown) protected from the fluid by the diaphragm (not shown). A diaphragm operates with the oil pressure fluid mechanically supplied by the solenoid between a piston and a diaphragm. Preferably, let the measuring pump 306 concerning this invention be the diaphragm pump of a solenoid drive from a viewpoint which can carry out [ minimum ]-izing of the operation components. As a diaphragm pump of a suitable solenoid drive, it is ProMinent. Dosiertechnik The pump made from GmbH (trademark Beta) is marketed. This pump moves with an electrical signal, it has the air valve which consists of a 2 location 4 direction electric solenoid valve, and an air valve has a single handler and a spring return mechanism. If power is given, a valve spool will move and the pressure up of the pressure of an air chamber will be carried out with air. While a spring return mechanism lowers the pressure of the air chamber by which the pressure up was carried out in the valve spool, it is made to move to the location which carries out the pressure up of this air chamber and the air chamber which counters, if an electrical signal is canceled. A pump reciprocates by adding and canceling power by turns. If supply of an electrical signal becomes quick, a pump will also operate more quickly.

[0014] The clean system concerning this invention is especially used for the external lead bonding process of having the following processes, suitably. First, as shown in drawing 6 , the pad (or lead) 404 of a display panel 406 is defecated by the clean system 300 concerning this invention. Then, the anisotropy electric conduction tape 500 (R> drawing 6 6 reference) which has an adhesive property essentially is attached in the display panel 406 on a pad (or lead) 404. Next, the tape career package (TCP) 502 is arranged on a display panel 406. Generally TCP502 possesses a film 504, the driver chip 506 combined with a film 504, and two or more external leads 508 formed on a film 504 (for example, stuck). Here, the minute gap is prepared between two approaching external leads 508. At this process, the external lead 508 of TCP502 is adjusted with the pad (or lead) 404 of a display panel 406. Finally, the external lead 508 of a tape career package is combined with a pad (or lead) 404 for example, by the thermocompression bonding tool.

[0015] The clean system concerning this invention permutes the conventional peristaltic pump with a piston pump, a gear pump, and a measuring pump like a diaphragm pump. Since a piston pump, a gear pump, and a diaphragm pump are faced operating and a component like the crookedness tube of the conventional peristaltic pump which wears out easily is not needed, throughput can be increased, while being able to make the operation life of a clean system longer than the conventional clean system, therefore being able to reduce an operation stop time. Furthermore, the clean system concerning this invention cannot fully coexist with the existing ingredient and related equipment which are used for the external lead bonding process, and does not affect those engine performance.

[0016] As mentioned above, although this invention has been explained with reference to a desirable example, it could understand that many other examples of a change and modifications can be performed without deviating from the summary and range of this invention charged below.

[0017]

[Effect of the Invention] By this invention, while being able to lessen operation hold time amount, the clean system of the long operation life which can increase throughput can be offered. Furthermore, a clean system with the dependability which uses it in an external lead bonding process in order to defecate a substrate with the pad (or lead) formed on this substrate can be offered.

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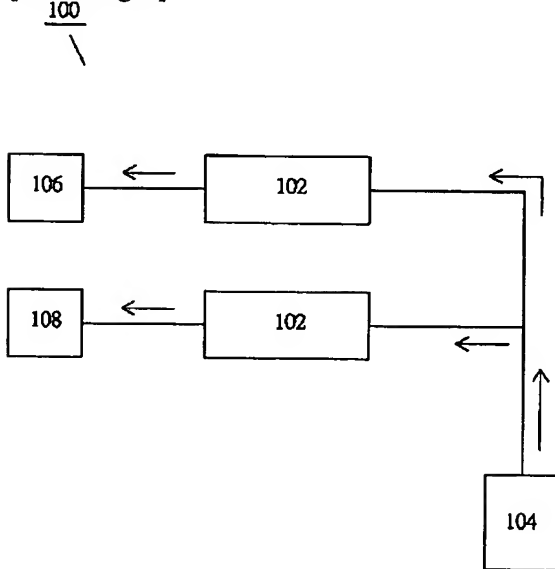
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**DRAWINGS**

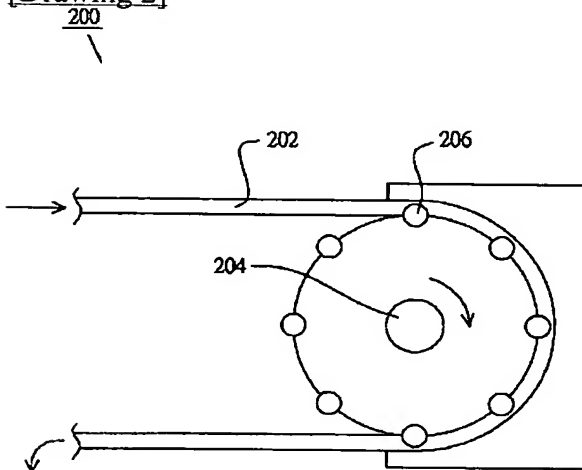
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[Drawing 1]



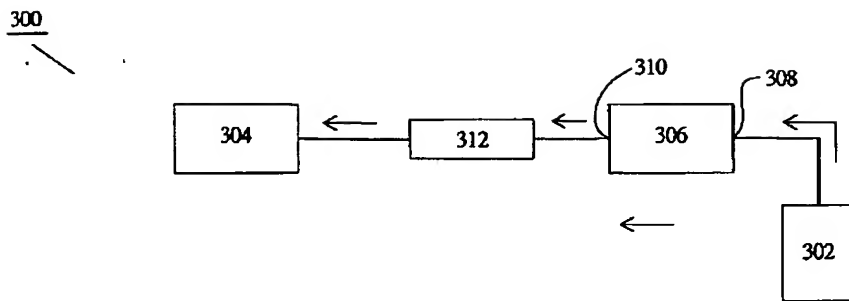
**従来技術**

[Drawing 2]

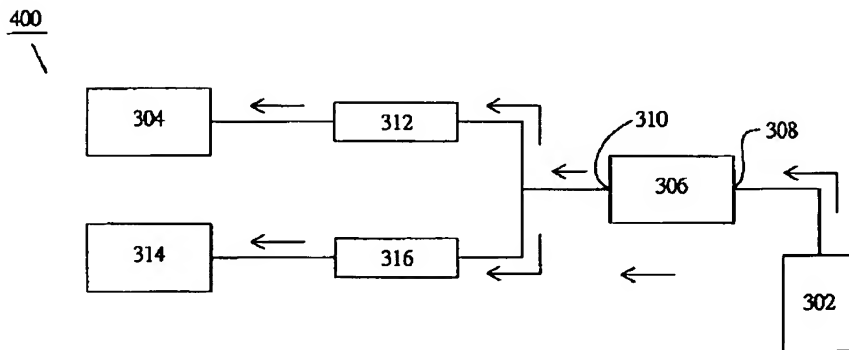


**従来技術**

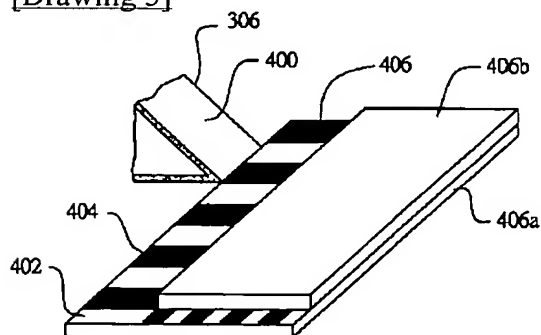
[Drawing 3]



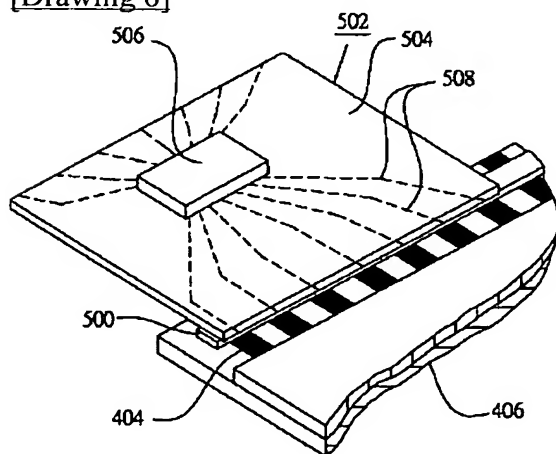
[Drawing 4]



[Drawing 5]



[Drawing 6]



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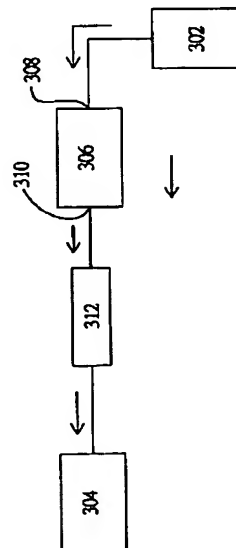
KK10 LL06 LL07 LL08

(54) 【発明の名称】 クリーンシステム

(57) 【要約】

【課題】 作業停止時間を少なくできると共に処理量を増大できる長稼動寿命のクリーンシステムを提供する。

【解決手段】 本発明のクリーンシステム300は、清浄化用流体を貯蔵する貯留槽302と、基板上のパッド(又はリード)404を清浄化するためのクリーンヘッド304と、清浄化用流体を貯留槽302からクリーンヘッド304へ吐出するための蠕動ポンプ以外の計量ポンプ306とを具備する。本発明で好適に使用できる計量ポンプは、ピストンポンプ、ギアポンプ又はダイヤフラムポンプである。





## 【特許請求の範囲】

【請求項 1】基板上の第 1 表面上に形成される少なくとも 1 つのパッドを有する前記基板を清浄化するシステムであって、

清浄化用流体を貯蔵する貯留槽と、

前記基板上の前記パッドを清浄化するための第 1 クリーンヘッドと、

前記清浄化用流体を前記貯留槽から前記クリーンヘッドへ吐出するための蠕動ポンプ以外の計量ポンプと、を具備するシステム。

【請求項 2】前記計量ポンプが、前記貯留槽に接続され、前記吐出すべき清浄化用流体の前記計量ポンプへの流入を可能とする流入口と、前記第 1 クリーンヘッドに接続され、前記吐出すべき清浄化用流体の前記計量ポンプから前記クリーンヘッドへの流入を可能にする流出口と、を具備することを特徴とするクレーム 1 記載のシステム。

【請求項 3】前記システムはさらに前記計量ポンプと前記第 1 クリーンヘッドとの間に配置される第 1 逆止弁を具備し、該逆止弁は、前記清浄化用流体が前記第 1 クリーンヘッドから前記計量ポンプに逆流するのを防止するため選択的に閉弁することを特徴とするクレーム 1 記載のシステム。

【請求項 4】前記クリーンヘッドが、前記清浄化用流体を担持し、前記基板上の前記パッドと接触して清浄化する紐状物を有することを特徴とするクレーム 1 記載のシステム。

【請求項 5】前記紐状物は不織紐状物であることを特徴とするクレーム 4 記載のシステム。

【請求項 6】前記計量ポンプはピストンポンプであることを特徴とするクレーム 1 記載のシステム。

【請求項 7】前記計量ポンプはギアポンプであることを特徴とするクレーム 1 記載のシステム。

【請求項 8】前記計量ポンプはダイヤフラムポンプであることを特徴とするクレーム 1 記載のシステム。

【請求項 9】前記計量ポンプはソレノイド駆動のダイヤフラムポンプであることを特徴とするクレーム 1 記載のシステム。

【請求項 10】前記システムはさらに、前記計量ポンプに接続され、前記第 1 表面と対向する前記基板の第 2 表面を清浄化する第 2 クリーンヘッドと、前記計量ポンプと前記第 2 クリーンヘッドとの間に配置され、前記清浄化用流体が前記第 2 クリーンヘッドから前記計量ポンプに逆流するのを防止するため選択的に閉弁する逆止弁と、を具備することを特徴とするクレーム 1 記載のシステム。

【請求項 11】前記各クリーンヘッドが、前記清浄化用流体を担持し、前記基板の前記第 1 表面又は前記第 2 表

面と接触して清浄化する紐状物を有することを特徴とするクレーム 10 記載のシステム。

【請求項 12】前記紐状物は不織紐状物であることを特徴とするクレーム 10 記載のシステム。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、一般にクリーンシステム、特に表示パネル上に形成されるパッド（又はリード）を清浄化するクリーンシステムに関する。

## 【0002】

【従来の技術】電子機器の表示パネルとして、従来、液晶パネルやプラズマ表示パネルが知られている。一般に、このような表示パネルは駆動装置の外部リードをガラス板からなる下部パネルの端部に位置するパッド（又はリード）に結合することによって組み立てられる。一般的なドライバー（駆動回路）は、TAB（テープオートメיתיッドボンディング）法によって形成されるテープキャリアパッケージ（以下、TCP という。）からなる。

【0003】しかし、ボンディングプロセスが行なわれる前に、TCP の外部リードとパネルのパッド（又はリード）間の良好な電氣的接触を確保するため、パネルのパッド（又はリード）を清浄化する必要がある。従って、従来の外部リードボンディング装置は、一般的に、パネルのパッド（又はリード）を清浄化するためのクリーンシステムを有する。図 1 に示すように、従来のクリーンシステム 100 は、清浄化用流体を貯留槽 104 から上部クリーンヘッド 106 及び下部クリーンヘッド 108 にそれぞれ供給するため、2 つの処理ユニット 102 を有する。

【0004】現在、各処理ユニット 102 は、それぞれ、設定量の清浄化用流体の正確な供給を確実にこなうために、蠕動ポンプ 200（図 2 参照）を具備する。図 2 に示すように、蠕動ポンプ 200 の作動は、回転ローラヘッド 204 を用いて、所定長さの屈曲自在なチューブ 202（固定流路間に配置される場合もある）を圧縮したり絞ったりすることによって行なわれる。ローラヘッド 204 が回転すると、ローラ 206 がチューブ 202 の一部をつまみ、ローラ 206 間でチューブ 202 内に補足されている如何なる流体も回転方向に押し出す。この際、流量はローラヘッド 204 の回転速度と駆動力によって決定される。

## 【発明が解決しようとする課題】

【0005】しかし、このような外部リードボンディング装置において、蠕動ポンプを処理ユニットとして用いることには、以下の問題点がある。

（a）蠕動ポンプの屈曲自在なチューブは作動中に摩滅し、その結果、清浄化流体の望ましくない流量変化を生じる。

（b）摩滅したチューブを周期的に交換する必要があ

り、また、その交換に際しては、外部リードボンディング装置全体を完全に停止する必要がある。

(c) 蠕動ポンプの機構部が容易に磨耗する。  
これらの欠点は、チューブの交換や蠕動ポンプの補修に必要な費用を増大するのみならず、作業停止時間を著しく増大し、また、処理量の大幅な低減をもたらす。

【0006】従って、本発明は、上述した従来技術の問題を解決でき、又は、少なくとも低減でき、作業停止時間を少なくできると共に処理量を増大できる長稼動寿命のクリーンシステムを提供することを目的とする。本発明の他の目的は、基板を、同基板上に形成されるパッド（又はリード）と共に清浄化するため、外部リードボンディングプロセスにおいて用いる信頼性のあるクリーンシステムを提供することにある。

#### 【課題を解決するための手段】

【0007】上記した目的及び他の目的を達成するため、本発明に係るクリーンシステムは、主として、清浄化用流体を貯留する貯留槽と、第1クリーンヘッドと、清浄化用流体を貯留槽から第1クリーンヘッドに吐出する蠕動ポンプ以外の計量ポンプを具備する。本発明において好適に用いることができる計量ポンプは、吐出サイクル毎に同容積を吐出するための一定容積の空所を有することを特徴とするピストンポンプ、ギアポンプ又はダイアフラムポンプである。計量ポンプは流入口と流出口とを有する。流入口は貯留槽に接続されており、清浄化用流体の計量ポンプへの流入を可能とする。流出口は第1クリーンヘッドに接続されており、清浄化用流体の計量ポンプから第1クリーンヘッドへの流入を可能とする。クリーンシステムは、清浄化用流体が第1クリーンヘッドから計量ポンプに逆流するのを防止するため、計量ポンプと第1クリーンヘッドとの間に配置される逆止弁を具備することもできる。

【0008】クリーンシステムは第2クリーンヘッドを具備することもできる。第1及び第2クリーンヘッドは、上記した同一の計量ポンプに接続されている。クリーンヘッドは、好ましくは、半製品の表面に接触して清浄化する紐状物、例えば、不織紐状物を具備する。紐状物を清浄化用流体によって湿らすことによって、クリーンヘッドは、埃、塵、その他の表面汚染物質を半製品の表面から容易に拭き取ることができる。

【0009】本発明に係るクリーンシステムは、従来の蠕動ポンプを、ピストンポンプや、ギアポンプや、ダイアフラムポンプのような計量ポンプによって置換するものである。ピストンポンプ、ギアポンプ又はダイアフラムポンプの作動においては、従来の蠕動ポンプの屈曲自在なチューブのような容易に摩滅する部品を必要としないので、クリーンシステムの稼動寿命を従来のクリーンシステムより長くでき、従って、作業停止時間を低減できると共に処理量を増大することができる。さらに、本発明に係るクリーンシステムは、外部リードボンディン

グプロセスに用いられる既存の材料や関連する機器と十分に共存できるものであり、かつ、それらの性能に影響を及ぼすものではない。

【0010】本発明は、従来の蠕動ポンプをピストンポンプ、ギアポンプ又はダイアフラムポンプのような計量ポンプによって置換することによって、長稼動寿命を有することができるクリーンシステムを提供する。ここで提示する解決策は、既存の装置と十分に共存できるものであり、かつ、それらの性能に影響を及ぼすものではない。

#### 【発明の実施の形態】

【0011】図3は、本発明の1実施例に係るクリーンシステム300を示すブロック図である。クリーンシステム300は、主として、貯留槽302と、クリーンヘッド304と、計量ポンプ306とを具備する。貯留槽302は、イソプロピルアルコール（IPA）のような清浄化用流体を内蔵している。計量ポンプ306は、貯留槽302からクリーンヘッド304に向けて清浄化用流体を吐出する。計量ポンプ306は流入口308と流出口310を有する。流入口308は貯留槽302に接続されているので、吐出される清浄化用流体の計量ポンプ306への流入が可能となる。流出口310はクリーンヘッド304に接続されているので、計量ポンプ306から吐出される清浄化用流体のクリーンヘッド304内への流入が可能となる。クリーンシステムは、計量ポンプ306とクリーンヘッド304間に配置される逆止弁312を具備してもよい。逆止弁312は、清浄化用流体がクリーンヘッド304から計量ポンプ306に逆流するのを防止するため、選択的に閉弁する。本発明に係るクリーンヘッド304は、表示パネル406の上面402に形成されるパッド（又はリード）404（1つのパッドのみが参照番号404で示されている。）を清浄化するため好適に用いられる（図5参照）。クリーンヘッド304は、好ましくは、表示パネル406上のパッド（又はリード）404を接触しながら清浄化するため、例えば不織紐状物からなる紐状物400を有する。清浄化用流体がクリーンヘッド304内に吐出されると、紐状物400は清浄化用流体によって湿らすことができるので、パッド（又はリード）404の表面から、埃、塵、その他の表面汚染物質を簡単に拭き取ることができる。

【0012】図4は、本発明の他の実施例に係るクリーンシステム350を示すブロック図である。図4に示すように、本発明では、さらに、表示パネル406の上面402と対向する下面を清浄化するため、同一の計量ポンプ306に連結されるもう一つのクリーンヘッド314を設けている（図5参照）。クリーンヘッド314は、クリーンヘッド304と実質的に同じ構造と材料を有する。計量ポンプは、貯留槽302からクリーンヘッド304とクリーンヘッド314の両方に清浄化用流体

を吐出する。好ましくは、クリーンシステム350は、計量ポンプ306とクリーンヘッド314間に配置される逆止弁316を有する。逆止弁316は、清浄化用流体がクリーンヘッド314から計量ポンプ306に逆流するのを防止するため、選択的に閉弁する。

【0013】本発明での使用に適する計量ポンプは、吐出サイクル毎に同容積を吐出する一定容積の空所を有することを特徴とするピストンポンプ、ギアポンプ、又はダイアフラムポンプである。ピストンポンプはユニットを通して液体を移動させるために往復動プランジヤを用いる。ピストンポンプは剛性ピストン組立体からなり、このような構成によって、ピストンポンプは、計量ポンプとして最高の圧力と精度を有することができる。ギアポンプは、2つ又は3つの回転するギアの歯の間に介在する流体を移送することによって作動する。ギアポンプは1回転当たり多くの小さな空所を移動させるので、ピストンポンプほど頻りに脈動しない。ダイアフラムポンプは、屈曲自在なダイアフラムを脈動させることによって、ストローク毎に液体を移動させる。ポンプ作用は、ダイアフラム（図示せず）によって流体から保護されている往復動ピストン（図示せず）によってさらに増大する。ダイアフラムは、ソレノイドによって機械的に、又は、ピストンとダイアフラム間に供給される油圧流体によって作動される。好ましくは、本発明に係る計量ポンプ306は、稼動部品を最少化できる観点から、ソレノイド駆動のダイアフラムポンプとする。好適なソレノイド駆動のダイアフラムポンプとして、ProMinent Dosiertechnik GmbH製のポンプ（商標Beta）が市販されている。このポンプは電気信号によって進退し、2位置4方向電気ソレノイド弁からなる空気弁を有し、空気弁は単一の操作子とスプリング復帰機構を有する。電力を付与すると、弁スプールが移動して空気室の圧力を昇圧する。電気信号を解除すると、スプリング復帰機構が、弁スプールを、昇圧された空気室を降圧すると共に同空気室と対向する空気室を昇圧する位置まで移動させる。ポンプは、電力を交互に付加、解除することによって往復動する。電気信号の供給が速くなれば、ポンプもより速く作動する。

【0014】本発明に係るクリーンシステムは、以下の工程を有する外部リードボンディングプロセスに、特に好適に用いられる。まず、図6に示すように、表示パネル406のパッド（又はリード）404を、本発明に係るクリーンシステム300によって清浄化する。その後、本来的に接着性のある異方性導電テープ500（図6参照）を、パッド（又はリード）404上の表示パネル406に取り付ける。次に、テープキャリアパッケージ（TCP）502を表示パネル406上に配置する。TCP502は、一般的に、フィルム504と、フィルム504に結合されるドライバチップ506と、フィルム504上に形成される（例えば、貼り付けられる）

複数の外部リード508とを具備する。ここで、2つの近接する外部リード508間には微小な間隙が設けられている。この工程で、TCP502の外部リード508は、表示パネル406のパッド（又はリード）404と整合する。最後に、テープキャリアパッケージの外部リード508を、例えば、熱圧着工具によってパッド（又はリード）404に結合する。

【0015】本発明に係るクリーンシステムは、従来の蠕動ポンプを、ピストンポンプや、ギアポンプや、ダイアフラムポンプのような計量ポンプによって置換するものである。ピストンポンプや、ギアポンプや、ダイアフラムポンプを作動するに際し、従来の蠕動ポンプの屈曲チューブのような容易に摩滅する構成要素を必要としないので、クリーンシステムの稼動寿命を従来のクリーンシステムより長くでき、従って稼動停止時間を低減できると共に処理量を増大できる。さらに、本発明に係るクリーンシステムは、外部リードボンディングプロセスに用いられている既存の材料及び関連機器と十分に共存できるものであり、かつ、それらの性能に影響を及ぼすものではない。

【0016】以上、本発明を好ましい実施例を参照して説明してきたが、多くのほかの変容例や変形例を、以下に請求される本発明の要旨及び範囲から逸脱することなく行なえることが、理解できるであろう。

【0017】

【発明の効果】本発明により、作業停止時間を少なくできると共に処理量を増大できる長稼動寿命のクリーンシステムを提供することができる。さらに、基板を、同基板上に形成されるパッド（又はリード）と共に清浄化するため、外部リードボンディングプロセスにおいて用いる信頼性のあるクリーンシステムを提供することができる。

【図面の簡単な説明】

【図1】従来のクリーンシステムを示すブロック図である。

【図2】図1に示すクリーンシステムで用いられる蠕動ポンプの概略側面図である。

【図3】本発明の一実施例に係るクリーンシステムを示すブロック図である。

【図4】本発明の他の実施例に係るクリーンシステムを示すブロック図である。

【図5】表示パネル上のパッド（又はリード）を清浄化するために用いられる図3のクリーンシステムのクリーンヘッドを示す図である。

【図6】図5の表示パネルに結合されるテープキャリアパッケージの拡大斜視図である。

【符号の説明】

300：クリーンシステム

302：貯留槽

304：クリーンヘッド

(5)

特開2003-311220

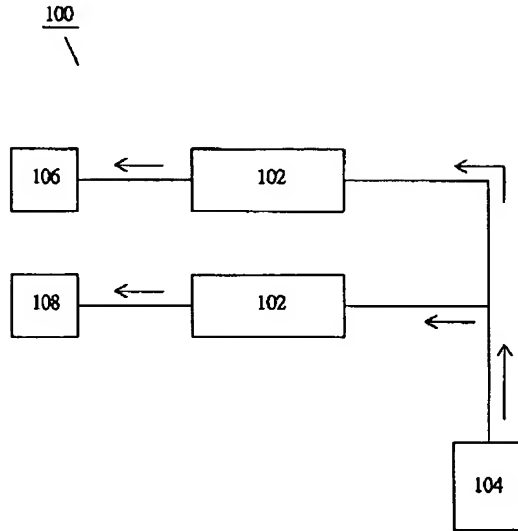
8

306: 計量ポンプ  
308: 流入口  
310: 流出口  
312: 逆止弁  
400: 紐状物  
402: 上面

\* 404: パッド (又はリード)  
406: 表示パネル  
504: フィルム  
506: ドライバーチップ  
508: 外部リード

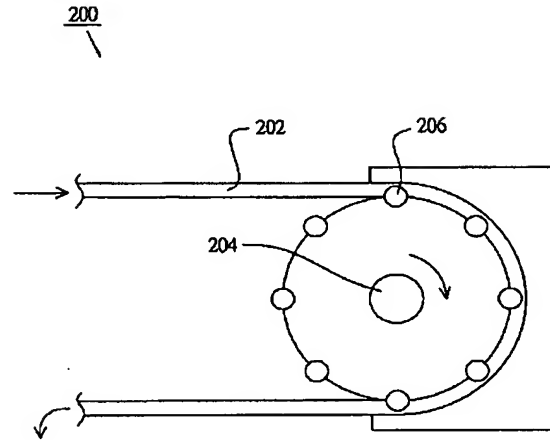
\*

【図1】



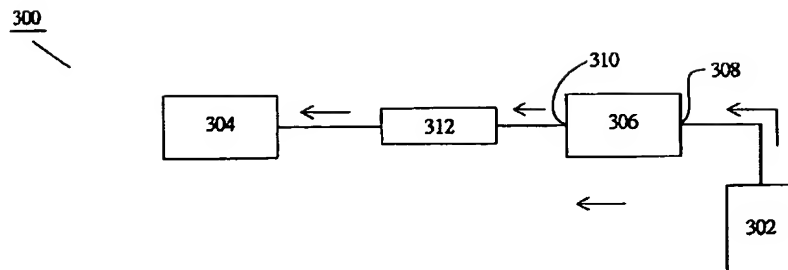
従来技術

【図2】

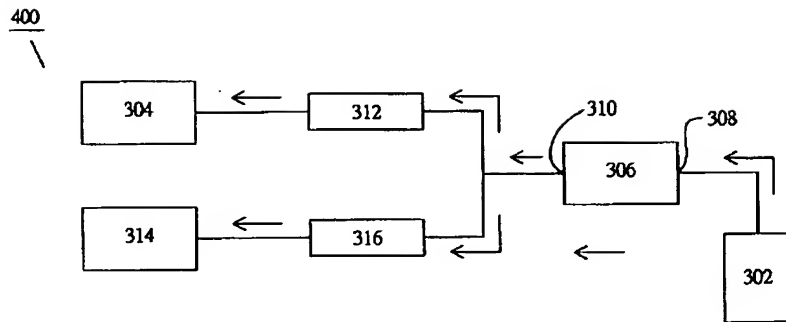


従来技術

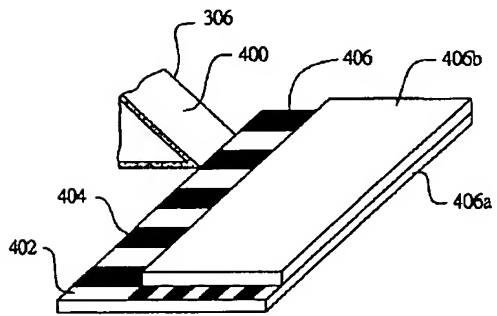
【図3】



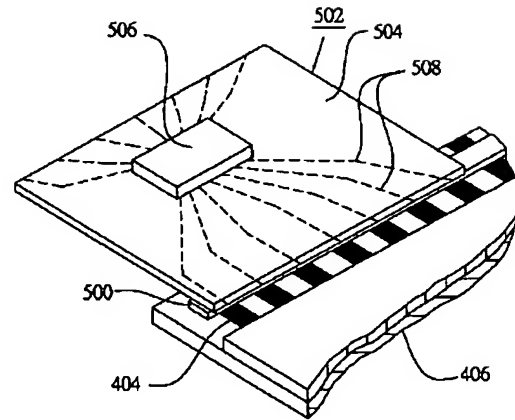
【図4】



【図5】



【図6】



【外国語明細書】

**CLEAN SYSTEM****Background of the Invention****1. Field of the Invention**

5 This invention generally relates to a clean system, and more particularly to a clean system for cleaning pads (or leads) formed on a display panel.

**2. Description of the Related Art**

As a display panel for electronic appliances, a liquid crystal panel or a plasma display panel has been known in the art. Generally, such display panel is assembled by bonding an outer lead of a driver device to a pad (or lead) located at an end part of an under panel made of  
10 a glass board etc. A common driver is a Tape Carrier Package (hereinafter is referred to as TCP) which is made by the TAB (Tape Automated Bonding) method.

However, before the bonding process is conducted, the pad (or lead) of the panel needs to be cleaned to ensure good electrical contact between the outer lead of the TCP and the pad (or lead) of the panel. Therefore, a conventional outer lead bonding apparatus typically  
15 includes a clean system for cleaning the pad (or lead) of the panel. As shown in FIG. 1, the conventional clean system 100 includes two dispensing units 102 for delivering the cleaning fluid from the reservoir 104 to an upper clean head 106 and a lower clean head 108 respectively.

Currently, each of the dispensing unit 102 comprises a peristaltic pump 200 (see FIG. 2)  
20 for insuring accurate delivery of a preselected quantity of the cleaning fluid. Referring to FIG. 2, the peristaltic pump 200 works by compressing or squeezing a length of flexible tubing 202 (sometimes between a fixed race) using a rotating roller head 204. As the roller head 204 rotates, the rollers 206 pinch off a portion of the tubing 202 and push any fluid trapped in the tubing 202 between the rollers 206 in the direction of rotation. Rotation speed  
25 and driving force determine flow rates.

However, to use peristaltic pump as a dispensing unit in the outer lead bonding apparatus suffers from the following shortcomings:

(a) The flexible tubing of the peristaltic pump is abraded during operation, which results in undesired changes in the flow rate of the cleaning fluid.

(b) The abraded tubing needs to be replaced periodically, and the entire outer lead bonding machine needs to be shut down during the replacement.

(c) The mechanisms of the peristaltic pump are easily worn out.

5 These drawbacks not only raise the cost for replacing the tubing and repairing the peristaltic pump but also cause significant operating down time and reduction of throughput.

#### **Summary of the Invention**

Therefore, it is an object of the present invention to provide a clean system with long operating life which overcomes, or at least reduces the above-mentioned problems of the prior art thereby reducing operating down time and increasing throughput.

10 It is another object of the present invention to provide a reliable clean system for use in an outer lead bonding process to clean the substrate with pads (or leads) formed thereon.

To achieve the above listed and other objects, the clean system of the present invention mainly includes a reservoir for storing a cleaning fluid, a first clean head and a metering pump other than the peristaltic pump for pumping the clean fluid from the reservoir to the first clean head. Suitable metering pumps for use in the present invention are piston pumps, gear pumps or diaphragm pumps that feature a fixed-volume cavity to deliver the same volume with every pumping cycle. The metering pump has an inlet and an outlet. The inlet connects to the reservoir and allows the cleaning fluid to flow into the metering pump. The outlet connects to the first clean head and allows the cleaning fluid to flow from the metering pump into the first clean head. The clean system may include a check valve disposed between the metering pump and the first clean head to prevent the cleaning fluid from flowing from the first clean head back to the metering pump.

20 The clean system may be provided with a second clean head. The first and second clean heads connect to the same metering pump mentioned above. It is preferred that the clean head includes a strip, e.g., a nonwoven strip, for contacting and cleaning the surface of a workpiece. When the strip is moistened by the cleaning fluid, the clean head can wipe dirt, dust or other surface contaminants from the surface of the workpiece easily.

30 The clean system of the present invention replaces the conventional peristaltic pump with metering pumps, such as piston pumps, gear pumps or diaphragm pumps. Since the easily worn-out component such as the flexible tubing of the conventional peristaltic pump is not required in the operation of piston pumps, gear pumps or diaphragm pumps, the operating

life of the clean system is longer than conventional clean system thereby reducing operating down time and increasing throughput. Furthermore, the clean system of the present invention is fully compatible with the existing materials and related equipment utilized in the outer lead bonding process and does not affect their performance.

5

### **Brief Description of the Drawings**

Other objects, advantages, and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings:

FIG. 1 is a block diagram illustrating a conventional clean system;

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FIG. 2 is a schematic side view of a peristaltic pump utilized in the clean system shown in FIG. 1;

FIG. 3 is a block diagram illustrating a clean system according to one embodiment of the present invention;

15

FIG. 4 is a block diagram illustrating a clean system according to another embodiment of the present invention;

FIG. 5 illustrates a clean head of the clean system of FIG. 3 utilized in cleaning pads (or leads) on a display panel; and

FIG. 6 is a perspective view of a tape carrier package bonded on the display panel of FIG. 5 on an enlarged scale.

20

### **Detailed Description of the Preferred Embodiment**

The present invention provides a clean system with long operating life by replacing the conventional peristaltic pump with metering pumps, such as piston pumps, gear pumps or diaphragm pumps. The proposed solution is fully compatible with the existing apparatus and does not affect its properties.

25

FIG. 3 is a block diagram illustrating a clean system 300 according to one embodiment of the present invention. The clean system 300 mainly includes a reservoir 302, a clean head 304 and a metering pump 306. The reservoir 302 contains a cleaning fluid such as isopropyl alcohol, IPA.

30

The metering pump 306 pumps the cleaning fluid from the reservoir 302 to the clean head 304. The metering pump 306 has an inlet 308 and an outlet 310. The inlet 308



connects to the reservoir 302 for allowing the cleaning fluid to be pumped to flow into the metering pump 306. The outlet 310 connects to the clean head 304 for allowing the cleaning fluid to be pumped from the metering pump 306 to flow into the clean head 304. The clean system may include a check valve 312 disposed between the metering pump 306 and the clean head 304, wherein the check valve 312 selectively closes to prevent the cleaning fluid from flowing from the clean head 304 back to the metering pump 306. The clean head 304 of the present invention is suitable for use in cleaning pads (or leads) 404 (only one pad is denoted with reference numeral 404) provided on an upper surface 402 of a display panel 406 (see FIG. 5). The clean head 304 preferably includes a strip 400, e.g. a nonwoven strip for contacting and cleaning the pads (or leads) 404 on the display panel 406. When the cleaning fluid is pumped into the clean head 304, the strip 400 is moistened by the cleaning fluid thereby easily wiping dirt, dust or other surface contaminants from the surface of the pads (or leads) 404.

FIG. 4 is a block diagram illustrating a clean system 350 according to another embodiment of the present invention. As shown in FIG. 4, the present invention further provides another clean head 314 connecting to the same metering pump 306 for cleaning a lower surface opposing to the upper surface 402 of the display panel 406 (see FIG. 5). The clean head 314 has substantially same structure and material as the clean head 304. The metering pump pumps the cleaning fluid from the reservoir 302 to both the clean head 304 and the clean head 314. Preferably, the clean system 350 includes a check valve 316 disposed between the metering pump 306 and the clean head 314. The valve 316 selectively closes to prevent the cleaning fluid from flowing from the clean head 314 back to the metering pump 306.

Suitable metering pumps for use in the present invention are piston pumps, gear pumps or diaphragm pumps that feature a fixed-volume cavity to deliver the same volume with every pumping cycle. Piston pumps use a reciprocating plunger to move liquid through the unit. They have a rigid piston assembly, which gives them the highest pressure and accuracy of metering pumps. Gear pumps operate by carrying fluid between the teeth of two or three rotating gears. Since gear pumps move many small cavities per revolution, they do not pulse nearly as often as the piston pumps. Diaphragm pumps pulse a flexible diaphragm to displace liquid with each stroke. The pumping action is developed by a reciprocating piston (not shown) which is protected from the fluid by a diaphragm (not shown). Diaphragms are actuated either mechanically, by solenoid or by hydraulic fluid between the piston and the diaphragm. Preferably, the metering pump 306 of the present invention is solenoid actuated

diaphragm pumps because they have the fewest moving parts. A suitable solenoid actuated diaphragm pump is commercially available under the trademark 'Beta' from ProMinent Dosiertechnik GmbH. This pump is stroked by electrical impulses and has an air valve which is a two-position, four-way electrical solenoid valve that has a single operator and spring return. When electric power is applied, the valve spool shifts to allow an air chamber to be pressurized with air. When the electric signal is removed, the spring return mechanism shifts the valve spool to a position where the pressurized air chamber is exhausted while the opposite air chamber is pressurized. The pump reciprocates by alternately applying and removing electrical power. The faster the electrical impulses are provided to the pump, the faster the pump operates.

The clean system of the present invention is especially suitable for use in an outer lead bonding process including the following steps. First, as shown in FIG. 6, the pads (or leads) 404 of the display panel 406 is cleaned by the clean system 300 of the present invention. Then, an anisotropic conductive tape 500 (see FIG. 6) which is inherently adhesive is attached to the display panel 406 on the pads (or leads) 404. Next, a tape carrier package (TCP) 502 is disposed on the display panel 406. TCP 502 typically has a film 504, a driver chip 506 bonded on the film 504, and plural outer leads 508 formed (i.e., stuck) on the film 504 with a minute interval between two adjacent outer leads. In this step, the outer leads 508 of TCP 502 are aligned with the pads (or leads) 404 of the display panel 406. Finally, the outer leads 508 of the tape carrier package are bonded to the pads (or leads) 404 by, e.g. a thermo-compression bonding tool.

The clean system of the present invention replaces the conventional peristaltic pump with metering pumps, such as piston pumps, gear pumps or diaphragm pumps. Since the easily worn-out component such as the flexible tubing of the conventional peristaltic pump is not required in the operation of piston pumps, gear pumps or diaphragm pumps, the operating life of the clean system is longer than conventional clean system thereby reducing operating down time and increasing throughput. Furthermore, the clean system of the present invention is fully compatible with the existing materials and related equipment utilized in the outer lead bonding process and does not affect their performance.

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.

**What is claimed is:**

1. A system for cleaning a substrate having at least one pad formed on a first surface of the substrate, the system comprising:

a reservoir for storing a cleaning fluid;

5 a first clean head for cleaning the pad on the substrate; and

a metering pump other than a peristaltic pump for pumping the cleaning fluid from the reservoir to the first clean head.

2. The system as claimed in claim 1, wherein the metering pump comprises:

10 an inlet connecting to the reservoir for allowing the cleaning fluid to be pumped to flow into the metering pump; and

an outlet connecting to the first clean head for allowing the cleaning fluid to be pumped from the metering pump to flow into the first clean head.

3. The system as claimed in claim 1, further comprising a first check valve disposed between the metering pump and the first clean head, wherein the check valve selectively closes to prevent the cleaning fluid from flowing from the first clean head back to the metering pump.

4. The system as claimed in claim 1, wherein the clean head comprises a strip for carrying the cleaning fluid to contact with and clean the pads on the substrate.

5. The system as claimed in claim 4, wherein the strip is a nonwoven strip.

6. The system as claimed in claim 1, wherein the metering pump is a piston pump.

20 7. The system as claimed in claim 1, wherein the metering pump is a gear pump.

8. The system as claimed in claim 1, wherein the metering pump is a diaphragm pump.

9. The system as claimed in claim 1, wherein the metering pump is solenoid actuated diaphragm pump.

10. The system as claimed in claim 1, further comprising:

25 a second clean head connecting to the metering pump for cleaning a second surface of the substrate opposing to the first surface; and

a second check valve disposed between the metering pump and the second clean head, wherein the second valve selectively closes to prevent the cleaning fluid from flowing from the second clean head back to the metering pump.

- 5 11. The system as claimed in claim 10, wherein each clean head comprises a strip for carrying the cleaning fluid to contact with and clean the first or the second surfaces of the substrate.
12. The system as claimed in claim 10, wherein the strip is a nonwoven strip.

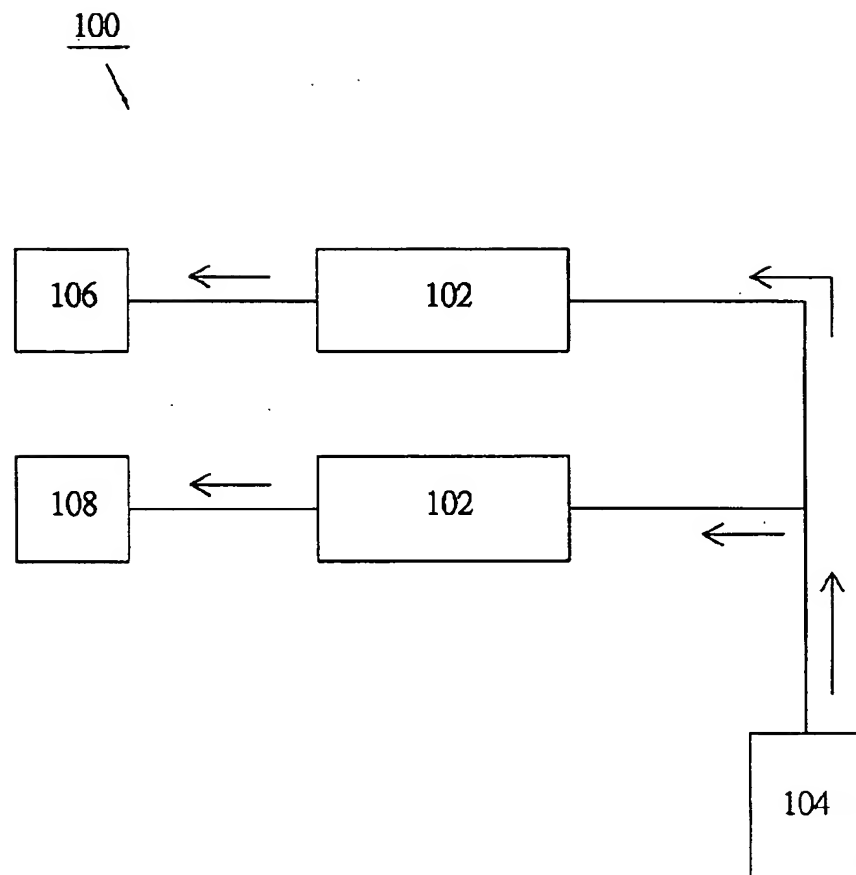


FIG. 1 (PRIOR ART)

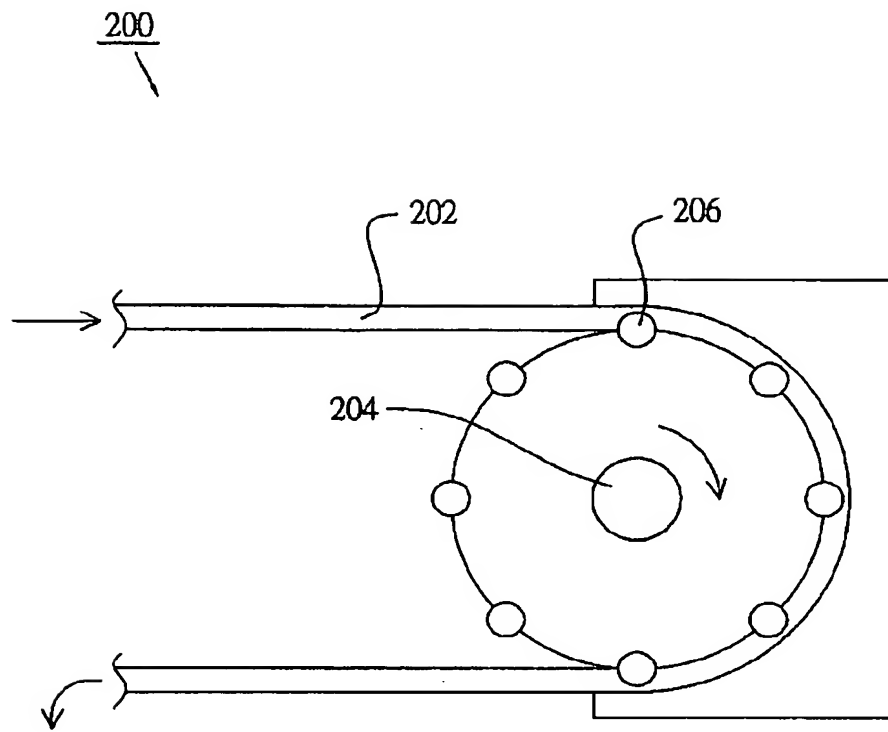
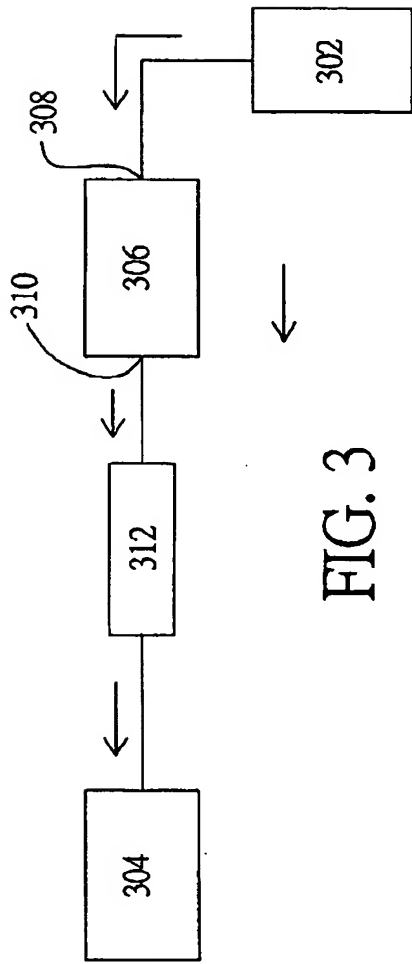
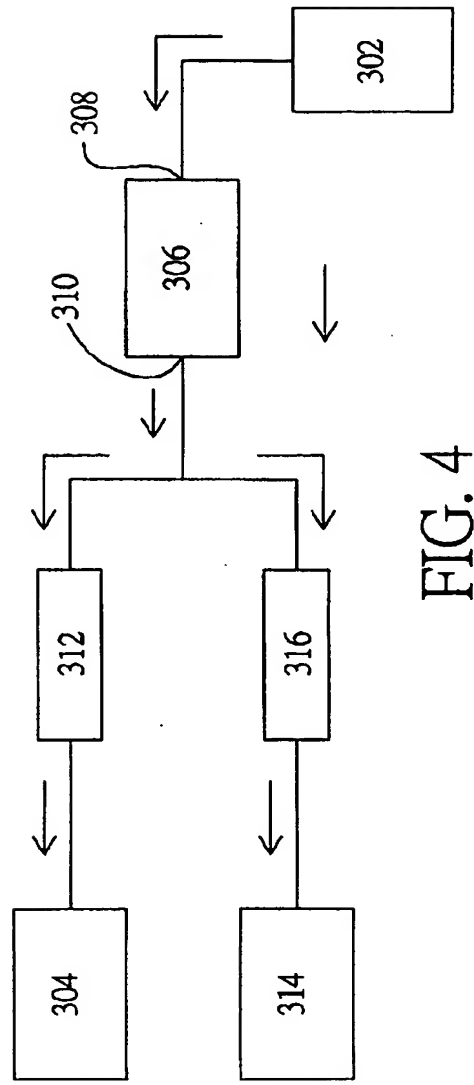


FIG. 2 (PRIOR ART)

300 /



350 /



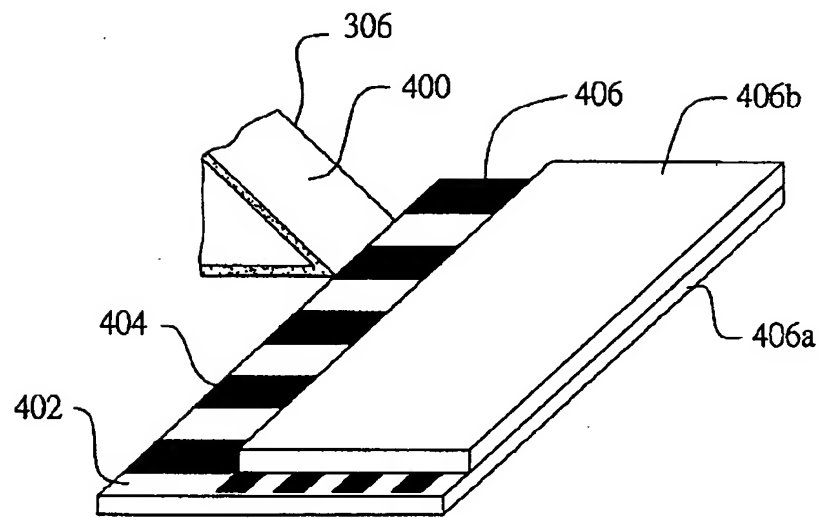


FIG. 5



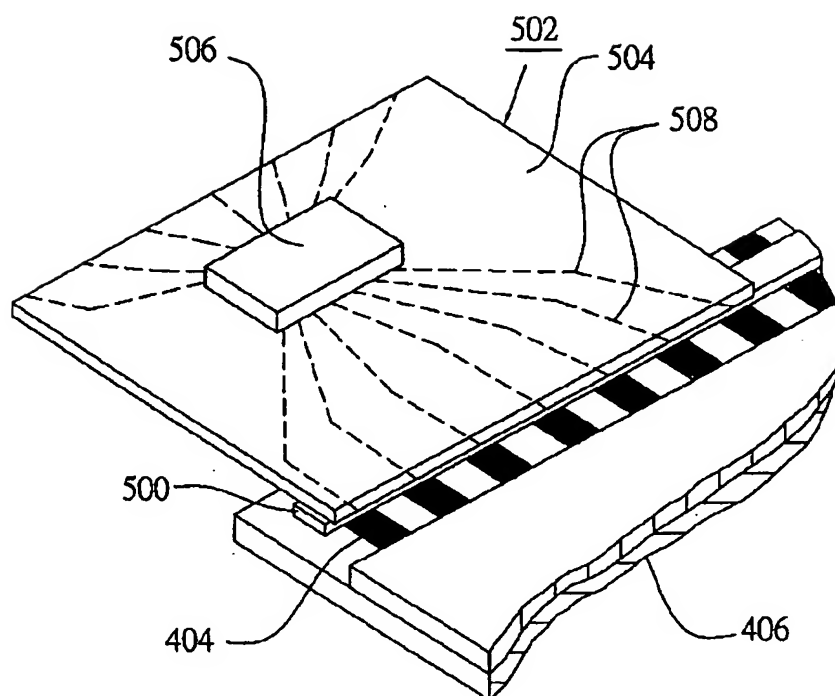


FIG. 6

**CLEAN SYSTEM****Abstract**

A clean system includes a reservoir for storing a cleaning fluid; a clean head for cleaning pads (or leads) on a substrate; and a metering pump other than a peristaltic pump for  
5 pumping the cleaning fluid from the reservoir to the clean head. Suitable metering pumps for use in the present invention are piston pumps, gear pumps or diaphragm pumps.

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